Nepal Rastra Bank

Syllabus for Engineer (Contract)

Civil and/or Architecture

Examinations

1. First Stage: Written Examination Full Marks: 100 Pass Marks: 40
2. Second Stage: Interview Full Marks: 20

Remarks:

1. In written examination, questions shall be asked in English.
2. Objective questions will be asked.
3. 20% marks will be deducted for each incorrect answer.
4. The candidates selected from the written examination will be called for the second stage examination.
5. This syllabus is applicable from January 8, 2025.

First Stage: Written Examination Full Marks: 100, Time: 60 Minutes

Examination System	Section	Number of Question and Marks	Total Marks
Multiple Choice Questions	1	4 Questions × 2 Marks	8 Marks
	2	5 Questions × 2 Marks	10 Marks
	3	5 Questions × 2 Marks	10 Marks
	4	10 Questions × 2 Marks	20 Marks
	5	4 Questions × 2 Marks	8 Marks
	6	7 Questions × 2 Marks	14 Marks
	7	5 Questions × 2 Marks	10 Marks
	8	5 Questions × 2 Marks	10 Marks
	9	2 Questions × 2 Marks	4 Marks
	10	3 Questions × 2 Marks	6 Marks
Total			100 Marks

Section 1. Constitution, Policy, Act & Rules

a. The Constitution of Nepal
b. Nepal Rastra Bank Act
c. Roles and Functions of NRB
d. National Building Code (NBC)
e. Public Procurement Act, 2063 and Regulations, 2064
f. Nepal Rastra Bank Procurement By-laws

Section 2. Structure Analysis and Design

a. Stresses and strains, theory of torsion and flexure
b. Analysis of beams and frames: bending moment, shear force and deflection of beams and frames
c. Concept of reinforced concrete structures, working stress and limit state philosophy.
d. Design of axially loaded columns with isolated and combined footings.
e. Analysis of steel and timber structures for standard and built-up sections
f. Common structural problems in RCC buildings in Nepal.
g. Requirements of earthquake resistant building construction.
h. Computer Aided Design (CAD) of building structure.
i. Mandatory Rule of Thumb in building design.
j. Non-engineered earthquake resistant building design

Section 3. Engineering Survey

a) Introduction and basic principles of surveying.
b) Linear measurement techniques, representation of measurement and common scales, sources of errors; effect of slope and slope correction, and its techniques, Introduction to: chain, tape, ranging rods and arrows, and their uses, measurement and scales, sources of errors, effect of slope and its correction, correction for chain and tape measurements.
c) Leveling and Contouring: principles of leveling, temporary and permanent adjustment of level, bench marks, booking methods and their reductions, longitudinal and cross sections survey, reciprocal leveling, trigonometric leveling, contour interval and their characteristics, method of contouring.
d) Theodolite traversing: Need of traverse and its significance, computation of coordinates, adjustment of closed traverse and closing errors.
e) Principle of triangulation, Computation of area and volume by different methods.
f) Use of Total Station and Electronic Distance Measuring Instruments.

Section 4. Construction Materials and Concrete Technology

a) Properties of building materials: physical, chemical, constituents, thermal etc.
b) Stones-characteristics and requirements of stones as a building materials
c) Ceramic materials: ceramic tiles, Mosaic tile, brick types and testing.
d) Cementing materials: types and properties of lime and cement, cement mortar tests.
e) Metals: types and properties of steel, alloys
f) Timber and wood: timber trees in Nepal, types and properties of wood
g) Miscellaneous materials: Asphaltic materials (Asphalt, Bitumen and Tar), paints and varnishes, polymers
h) Constituents and properties of concrete (physical and chemical)
i) Water Cement ratio
j) Grade and strength of concrete, concrete mix design, testing of concrete
k) Mixing, transportation pouring and curing of concrete
l) Admixtures, High strength and pre-stressed concrete.

Section 5. Engineering Drawing

a) Drawing sheet composition and its essential components
b) Suitable scales, site plans, preliminary drawings, working drawings
c) Theory of projection drawing: perspective, orthographic and axonometric projection, first and third angle projection
d) Drafting tools and equipment's
e) Drafting conventions and symbols
f) Topographic, electrical, plumbing and structural drawings
g) Techniques of free hand drawing
h) Community buildings: School and hospital buildings and their design considerations

Section 6. Building Materials

a) Stone masonry: Types of stone used in stone masonry, specifications of stone masonry.
b) Brick masonry: Classification of bricks, specifications of different types of bricks, testing of bricks, different shapes of bricks.
c) Hollow Concrete Blocks: Various types of concrete blocks, use of concrete blocks in buildings.
d) Sand: Requirement of good quality sand, sieve analysis, fineness modules.
e) Lime: Different types of lime and their uses test of freshness.
f) Mortar: Types of mortar, specifications, proportion of mortar for various types of masonry works.
g) Paintings: Types of paints, specification for various types of painting Works.

h) Waterproofing: Water proofing at basement, ground floor and roofs, common water proofing problems in Nepal.
i) Roofing Systems: Different types of roofing system.
j) Doors and windows: Different types of doors and windows, door and window details, merits and demerits of metal door and windows.
k) Walls: Different types of wall system, Load bearing walls, partition walls and curtain walls.
l) Pre-fabrication: Principles of pre-fabrication, advantages and disadvantages of a pre-fabricated building.
m) Flooring: Different types of flooring, specification of floorings.
n) Plastering: Different types of plasters and coating materials.
o) Formworks: Shoring, underpinning, scaffolding and formworks.
p) Building Elements: Foundation, super structure, lintel, floors, roofs, sun control devices, parapet, staircase, emergency stairs, elevators and escalators
q) Building services: water supply and sanitation, electrification, heating and ventilation and air-conditioning.
r) Maintenance and repair of buildings.
s) Principles of low cost construction techniques.

Section 7. Estimating, Costing, Specification and Valuation

a) Types of estimates and their specific uses
b) Methods of calculating quantities
c) Key components of estimating norms and rate analysis
d) Preparation of bill of quantities
e) Purpose, types and importance of specification
f) Purpose, principles and methods of valuation

Section 8. Construction Management

a) Construction scheduling and planning: network techniques (CPM, PERT) and bar charts
b) Contractual procedure and management: types of contract, bid and bid notice, preparation of bidding document, contractors pre-qualification, evaluation of tenders and selection of contractor, contract acceptance, condition of contract, quotation and direct purchase, classifications of contractors, dispute resolution, muster roll
c) Material management: procurement procedures and materials handling
d) Cost, quality and time control
e) Project management
f) Occupational health and safety

g) Project monitoring and evaluation
h) Quality assurance plan
i) Variation, alteration and omissions

Section 9. Engineering Economics

a) Benefit cost analysis, cost classification, sensitivity analysis, internal rate of return, time value of money; economic equilibrium, demand, supply and production, net present value, financial and economic evaluation

Section 10. Professional Practices

a) Ethics, integrity and professionalism: code of conduct and guidelines for professional engineering practices
b) Nepal Engineering Council Act, 2055; and regulations, 2056
c) Relation with clients, contractor and fellow professionals
d) Public procurement practices for works, goods and services and its importance
e) Building Bylaws